

**SCREENING FOR SCHISTOSOMA HAEMATOBIIUM INFECTION IN A RURAL COHORT OF PREGNANT WOMEN IN NIGERIA****<sup>1</sup>Ojurongbe, O., <sup>1</sup>Adeyeba, O. A., <sup>2</sup>Olowu, A. O., <sup>1</sup>Olowe, A. O.,  
<sup>1</sup>Opaleye, O. O., <sup>2</sup>Egbewale, B. E.****Departments of <sup>1</sup>Medical Microbiology/Parasitology and <sup>2</sup>Community Medicine  
College of Health Sciences, Ladoke Akintola University of Technology,  
PMB 4400, Osogbo, Nigeria****Correspondence to: Olusola Ojurongbe (E-mail: [stojurongbe@yahoo.com](mailto:stojurongbe@yahoo.com))**

Studies were conducted to investigate the occurrence of *Schistosoma haematobium* infection among 37 pregnant Nigerian women in Ilie, Osun state, Nigeria and to determine the effects on haemoglobin concentration and clinical symptoms. Out of the 37 pregnant women seen over a period of nine months, 14 (37%) had urinary schistosomiasis, with a mean egg count of 82.5eggs/10 mls of urine. The mean haemoglobin values in women with schistosomiasis mothers were lower than in women negative for the parasite but the differences were not statically significant ( $P > 0.05$ ). Abdominal pain was the predominant complaint among the women seen in with 71% of the infected women while other complaints were dizziness, fever and headache. This study shows that schistosomiasis is prevalent among pregnant women in rural area and could contribute to anaemia and abdominal pain commonly seen in pregnant women in our environment.

**Key words:** Schistosomiasis, Pregnant women, Abdominal pain, Haemoglobin values, Nigeria

**INTRODUCTION**

Schistosomiasis is endemic in 74 countries and infects more than 200 million people world wide (1). As a result of this parasite, women of reproductive age may experience genitourinary tract infection with renal complications, and salpingitis and tubal obstruction that can lead to infertility and ectopic pregnancy (2). In sub Saharan Africa, up to 24 million women may be pregnant each year and this high rate is often associated with increase susceptibility to infections because pregnancy is accompanied by high hormone activity which may exert immuno-suppressive effects (3).

Schistosomiasis, along with other helminthic infections, is a common occurrence particularly in rural areas of Nigeria and some studies have reported the relationship between schistosomiasis during pregnancy and tubal obstruction, anaemia, low birth weight and acute appendicitis (4-7). For example the prevalence of hookworm infection among pregnant women has been estimated to be 32% (8). Given the high fertility rate, low nutritional status and poor

hygienic conditions predominant in developing countries, schistosomiasis during pregnancy may contribute significantly to adverse pregnancy outcome.

The occurrence of schistosomiasis in pregnant women in Nigeria, their clinical manifestations and the disease association are largely unreported. This study serves as a preliminary investigation of prevalence and clinical effects of *Schistosoma haematobium* infection among pregnant women in a rural area of Nigeria.

**MATERIALS AND METHOD*****Subjects/Study area***

The subjects were pregnant women visiting the antenatal clinic (ANC) of Ilie health post of Olorunda Local Government area of Osogbo, Osun State, Nigeria between May 2002 and January 2003. Ilie is a very small community with a population of about 3 000 people. The women are Nigerians of the Yoruba ethnic group, who have been residing in the community for at least 5 years. The people of the community depended largely on a very close by stream for almost all their water

related activity. The purpose of the study was explained to the women and informed consent was sought. Only 37 women who consented were recruited to participate in the study.

#### Sample collection/examination

Urine samples were collected from the women into a universal bottle. Ten mls of urine was centrifuged at 2,500 rpm and the sediment was examined for eggs of *S. haematobium* using the sedimentation technique (9). The frequency of macroscopic haematuria was recorded. The presence of microscopic haematuria was confirmed using the Medi Test strip (Combi 9, Mcherey-Nagel Dueren) and the concentration was recorded as 10, 50 or 250 Ery/ $\mu$ L of urine. The haemoglobin concentration was evaluated using iron determination technique (10). The major water source in the community was examined for presence of snail (molluscs) using the kitchen sieve net method (11). Snails found were taken to the laboratory for identification and individual snail was examined for infection by exposure to sunlight.

#### Subject's bio-data

With the aid of a health worker, each participant was asked to complete a questionnaire, which contained information about demographic characteristics, duration of pregnancy, contact with stream and water usage, and clinical symptoms in pregnancy. Each woman had full examination normally carried out during routine ANC.

#### Statistical analysis

Differences in mean haemoglobin values between women positive for *S. haematobium*

infection and women negative were tested for statistical significance using Chi square ( $X^2$ ) analysis.

#### RESULT

Of the 37 pregnant women examined, 13 (37%) were infected with *S. haematobium* with an overall mean egg count of 82.5 eggs per 10 mls of urine. Microscopic haematuria was seen in 37% of all the urine samples while 29% presented with macroscopic haematuria. The age group > 30 years had the highest prevalence (50%) and also the highest mean egg count of 140.5, compared to age group 21-25 years with 12% and mean egg count of 56. This difference is statistically significant ( $P < 0.001$ ) (Table 1).

Table 2 shows the breakdown of infection per trimester of pregnancy and clinical symptoms. The most common complaint by the women is abdominal pain/discomfort seen in 71% of those with schistosomiasis compared to 17% in those without schistosomiasis. This difference is statistically significant ( $P < 0.05$ ). Other clinical complaints include dizziness, headache and fever (data not shown). All the women with schistosomiasis in the first trimester complained of abdominal discomfort.

Table 2 also illustrates the effect of *S. haematobium* on the mean haemoglobin values. The haemoglobin concentration values of women with *S. haematobium* infection were lower than the values in women negative for *S. haematobium* but these differences were not statistically significant ( $P > 0.05$ ).

Table 1: Prevalence, mean intensity and percentage microscopic haematuria of schistosomes among pregnant women by age

Age range (Years)	Number Examined	Number Positive	% Infected	Mean egg count/ 10mls	% with microscopic haematuria	% with macroscopic haematuria
16-20	9	4	44	41.3	55	33
21-25	8	1	12	56.0	37	12
26-30	12	4	33	92.0	41	41
> 30	8	4	50	140.5	63	75
Total	37	13	35	82.5	37	29

**Table 2: Prevalence, clinical complaints and mean haemoglobin concentration among pregnant women by trimester**

Trimester	No. Exam	Positive women				Negative women			
		% SH +ve	% Abd Pain	% others	Mean HC g/dL	% SH -ve	% Abd Pain	%others	Mean HC g/dL
1 <sup>ST</sup>	6	33	100	0	8.7 ± 1.6	66	20	16	9.2 ± 1.6
2 <sup>ND</sup>	21	28	71	4	8.9 ± 1.5	66	21	38	9.9 ± 1.3
3 <sup>RD</sup>	10	50	60	10	8.6 ± 1.3	50	0	30	10.3 ± 1.3
<b>Total</b>	<b>37</b>	<b>35</b>	<b>71</b>	<b>5</b>		<b>62</b>	<b>17</b>	<b>32</b>	

No. Exam - Number Examined  
 % SH +ve - Percentage *Schistosoma haematobium* positive  
 % SH -ve - Percentage *Schistosoma haematobium* negative  
 % Abd Pain - Percentage with Abdominal Pain  
 % others - Percentage with other Pregnancy related complaints  
 Mean HC- Mean haemoglobin concentration

**DISCUSSION**

This study has demonstrated that over 35% of pregnant women in rural areas endemic for schistosomiasis are infected with the parasite. The occurrence of this infection at high rate among the women is an indication of continuous pollution of water with schistosome eggs due to poor sanitation and improper sewage disposal. Studies in many parts of Nigeria have highlighted the hyper endemicity of schistosomiasis especially among school children in rural communities (12, 13, 14). Pregnant women are also at high risk of infection because of their close relationship with their children and the fact that they also engage in water related activities like washing in the stream, bathing, swimming and even fishing, which expose them to considerable contact with cercariae infested rivers.

The high incidence of abdominal pain among women with schistosomiasis may be due to congestion of pelvic vessels during pregnancy which facilitates the passage of eggs into the villi and intervillous spaces, with resultant inflammatory reactions and pain (5). Exacerbation of acute appendicitis during pregnancy by schistosomiasis has also been reported (4). Masses of schistosome eggs can lodge throughout the body

and cause acute inflammation of the appendix, liver and spleen (5). Acute infection is often asymptomatic, but can present with a non specific influenza-like illness or in extreme cases as potentially fatal Katayama fever, with cough, abdominal pain, diarrhoea, hepatosplenomegaly and eosinophilia.

The low haemoglobin level among women with schistosomiasis is attributed to chronic blood loss and iron deficiency, caused by terminal haematuria from urinary infection (2, 15). The most important cause of chronic blood loss and iron deficiency anaemia in the tropics, are helminthic infections (6, 17), especially hookworm (16), *S. mansoni*, *S. japonicum*, and *S. haematobium* infections (15, 17), and malaria (18).

Our study demonstrates that urinary schistosomiasis is still being actively transmitted among pregnant women in Ilie community, Osun State, Nigeria and could contribute to the abdominal discomfort, haematuria and anaemia seen in these women. The implementation of a control programme based on chemotherapy with Praziquantel<sup>®</sup> will help in the reduction of the frequency. Because the treatment with Praziquantel<sup>®</sup> is relatively simple and considered safe at least in the second and third trimester of

pregnancy, case management during pregnancy can be considered and would likely have important benefits in endemic settings (19, 20).

Also there is need for government to improve the health care delivery to the rural communities in the country. Most of the pregnant women do not make use of the ANC facility partly because of low level of awareness and also because the clinics are not well equipped. Although some of the women still prefers patronizing homes of traditional birth attendants (TBA), this mentality can be corrected with adequate public enlightenment and equipping the existing clinics. Provision of potable water, improved personal hygiene and extermination of immediate hosts are recommended.

#### ACKNOWLEDGEMENTS

The authors are grateful to Mr. Omotosho of Department of Morbid Anatomy, College of Health Sciences, LAUTECH, Osogbo.

#### REFERENCES

1. WHO, Schistosomiasis. <http://www.who.int/ctd/schisto/burdens.htm> (accessed May 2001)
2. Steketee, Pregnancy, Nutrition and parasitic diseases. *J. Nutr.* 2003; **133** (5 Suppl 2): 1661 - 1667
3. McGregor IA, Wilson ME, Billewicz WZ. Malaria infection in the placenta in The Gambia, West African: its incidence and relationship to stillbirth, birth weigh, and placental weight. *Trans R. Soc. Trop. Med. Hyg.* 1983; **77**: 234-244
4. Garba M, Almoustapha T, Garba A, Nouhou B. Extra uterine pregnancy associated with a tubal schistosomiasis due to *Schistosoma haematobium*; .a case report from Niger. *Bull. Soc Pathol. Exot.* 2004; **97**(1): 41- 42
5. Halkic N, Abdelmoumene A, Gintzburger D, Mosimann F. Schistosomal appendicitis in pregnancy. *Swiss Surg* 2002; **8**(3): 121-122
6. Obiamiwe BA. The pattern of parasitic infection in human gut at the specialist hospital Benin City, Nigeria. *Ann. Trop. Med Parasitol.* 1977; **7**: 35 - 43
7. Obiamiwe BA, Nmorsi P. Human gastro intestinal parasites in Bendel State, Nigeria. *Angrew Parasitol.* 1991; **32**: 177-183
8. Bundy DAP, Chan MS, Savidi I. Hookworm infection in pregnancy. *Trans. R. Soc Trop. Med. Hyg.* 1995; **89**: 521-522
9. Richard FO, Hassan F, Cline BL, Alamy BA. An evaluation of quantitative techniques for *Schistosoma haematobium* eggs in urine preserved with carbon fuchsin. *Am J. Trop. Med. Hyg.* 1984; **33**: 587 - 861
10. Toro G, Ackermann PG. Haemoglobin and haemoglobin derivatives. In Practical Clinical Chemistry, Little Brown and Co., Boston, 1975: 595 - 599
11. Adewunmi CO, Furu P, Christensen NO, Olorunmola F. Seasonality of transmission of human schistosomiasis in Ile Ife, South Western Nigeria. *Trop. Med. Parasitol.* 1990; **42**: 319 - 468
12. Bettertoen C, Ndifon GT, Bassey SE, Tan RM, Oyeyi T. Schistosomiasis in Kano State, Nigeria. I. Human infections near dam sites and distribution and habitat preference of potential snail intermediate hosts. *Ann. Trop. Med. Parasitol.* 1988; **82**: 561 - 570.
13. Adewunmi CO, Furu P, Christensen NO, Olorunmola F. Endemicity, seasonality and focality of transmission of human schistosomiasis in 3 communities in Southwestern Nigeria. *Trop. Med. Parasitol.* 1991; **43**: 332 - 334
14. Nmorsi OP, Egwunyenga OA, Okholo OE. *Schistosoma haematobium* infections in two rural communities of Edo State, Nigeria. *South Asian J. Trop. Med. Publ. Hlth* 2001; **32**(3): 570 -574
15. Farid Z., Bassily S, Schulert AR, Raasch F, Zeind AS, El Rooby AS, Sherif M. Blood loss in chronic *Schistosoma mansoni* infection in Egyptian farmers. *Trans. R. Soc. Trop. Med. Hyg.* 1967; **61**:621-625
16. Migasena S, Gilles AM. Hookworm infection. *Beilier's Clin. Trop. Med. Comm. Dis.* 1987; **2**: 617 - 627
17. Stephenson LS. Impact of helminth infections on Human Nutrition. Taylor and Francis Ltd, London and Philadelphia 1987
18. Egwunyenga AO, Ajayi JA, Nmorsi OPG, Duhlinska-Popova DD. Plasmodium/intestinal Helminth Co-infections among Pregnant Nigerian Women. *Mem. Inst. Oswaldo Cruz.* 2001; **96**(8): 1055 - 1059
19. WHO Monitoring Helminth Control Programs (WHI/CDS/CPC/SIP/99.3). WHO, Geneva, Switzerland, 1999.
20. WHO Report of the WHO Informal Consultation on Schistosomiasis Control (WHO/CDS/CPC/SIP/99.2). WHO, Geneva, Switzerland, 1998.

Visit our website: <http://www.ajol.info/journals/ajcem>